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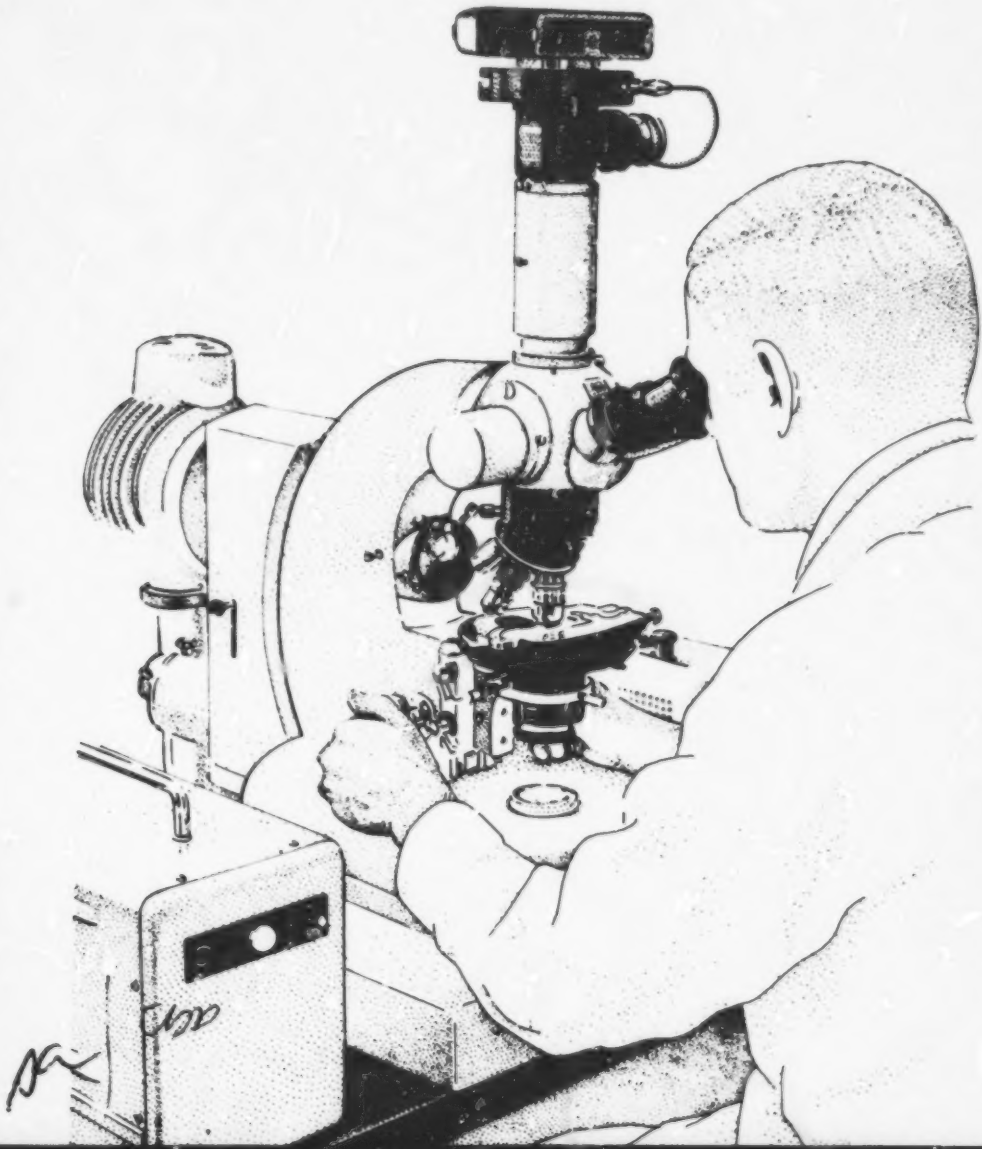
Research and Development

EPA

COMPLETED

Solicitation for Research Grant Proposals



Exploratory Research Grants

Introduction

The U S. Environmental Protection Agency (EPA) is responsible for implementing laws designed to mitigate or prevent environmental pollution. Central to the execution of its responsibility is the need for reliable, high quality scientific and technical information. Recognizing that some of the information needed to address current or emerging problems is not available, the Agency has established a long term, exploratory research program.

As part of this long term research effort, EPA's Office of Research and Development (ORD) established the Research Grants Program within the Office of Exploratory Research (OER) in 1980. The objective of this program is to develop an effective means to stimulate extramural scientists to work on EPA's technical problems, to complement existing EPA programs and to provide a stronger creative base for mission-oriented research needed for the Agency's regulatory and enforcement purposes. To date, through its Research Grants Program, OER has supported approximately 600 research projects in various priority areas as identified by the Agency's program planning mechanisms and ORD's Research Committees. This year, ORD's research priorities are in four major areas:

- Human health risk assessment methods: development and application
- Ecological risk assessment methods: development and application
- Total exposure assessment methods: development and application
- Risk reduction research concerned with reducing or eliminating the release of toxicants to the environment

Grants are an important means by which EPA underwrites research on environmental topics in the academic sector. Therefore, this document solicits investigator-initiated proposals to address ORD's priority research needs. This solicitation relates only to the research grants procedures as administered by ORD's Office of Exploratory Research and outlines the procedures for applying for grants assistance. Participation in the research grants assistance program does not preclude individuals or institutions from

engaging in EPA-sponsored research supported through cooperative agreements or contracts with ORD laboratories. Those interested in these aspects of EPA's research and development programs are encouraged to consult directly with personnel at the EPA laboratories. A list of these laboratories appears in Appendix A. Through this solicitation, OER seeks proposals for research in the following general program areas:

- Environmental Biology
- Environmental Health
- Environmental Engineering
- Environmental Air/Water Chemistry and Physics

Specific research topics are presented under the descriptions of each of the above program areas. Although this document emphasizes certain needs in the aforementioned research areas, it is by no means all inclusive. Every scientifically meritorious proposal is accorded full and fair consideration. The legislative and administrative limitations of this program require, however, that applications must be relevant to EPA's mission.

Application Procedures

The Research Grants Program accepts applications that respond to its general annual solicitation. In addition, applications are sought through more narrowly defined proposal requests, the Request for Applications (RFA). Application procedures for both mechanisms are outlined below.

General Grants

Application forms, instructions, and other pertinent information including general regulations for assistance programs at EPA are available in the EPA Research Grants Application/Information Kit. Interested investigators should review the material in this kit before preparing an application for assistance. The kits are available from:

Grants Operations Branch
Grants Administration Division (PM-216F)
U.S. Environmental Protection Agency
Washington, DC 20460

or

Research Grants Staff
Office of Exploratory Research (RD-675)
Office of Research and Development
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Fully-developed research grant applications, prepared in accordance with instructions in the Application for Federal Assistance Form No. 5700-12, should be sent to:

Grants Operations Branch
Grants Administration Division (PM-216F)
U.S. Environmental Protection Agency
Washington, DC 20460

A pre-addressed mailing label is provided in the Application/Information Kit.

If this solicitation is the basis for submitting a proposal, that fact may be entered on line 3 of Form 5700-12.

One copy of the application with original signatures plus eight copies are required. Informal, incomplete, or unsigned proposals will not be considered.

While applications are accepted year round, proposals will be evaluated at regular intervals. Closing dates for receipt of applications and review schedules are listed separately in each program area description. Applicants should contact the appropriate Science Review Administrator, whose name appears at the end of each program area description, for further information on review schedules.

Special Targeted Grants

When the Agency wishes to expand an existing research area or explore a new one in which current Agency efforts are either minimal or non-existent, targeted grants are awarded in a narrowly defined research topic. The purpose of these exploratory grants is to augment existing research within EPA with more fundamental studies, or to determine whether a more substantial research effort should be established by the Agency in the area targeted for study. The Office of Exploratory Research addresses this specific research need by issuing a special solicitation called a "Request for Applications" (RFA). The RFA is a mechanism by which a formal announcement is released describing a high priority initiative in a well defined scientific area.

Applicants are invited to submit research applications for a one-time competition using the standard application for Federal Assistance Form No. 5700-12. One copy of the application with original signatures plus eight copies should be mailed directly to:

Research Grants Staff
Office of Exploratory Research (RD-675)
Office of Research and Development

U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Funds for this special mechanism are generally set aside for a specified number of RFA's (where five to ten agreements are expected to be awarded per RFA). The deadlines for receipt of applications are identified in the RFA announcement. All responses received are reviewed for scientific merit by *ad hoc* extramural peer review panels.

As in the case of regular grants, an application for a targeted grant is only considered when a fully developed proposal is submitted on the required Application for Federal Assistance Form 5700-12.

Eligibility

Nonprofit institutions and state or local governments are eligible under all existing authorizations. Profit-making firms are eligible only under certain laws, and then under restrictive conditions, including the absence of any profit from the project.

Potential applicants who are uncertain of their eligibility should study the restrictive language of the law governing the area of research interest. This information is provided in the Research Grants Application/Information Kit.

Federal agencies and federal employees are not eligible to participate in this program.

Investigators at minority institutions or those who have not previously received support are encouraged to submit applications (See Minority Programs Section).

Funding Mechanism

For all regular and targeted grants, the funding mechanism will consist of a grant agreement between EPA and the recipient.

Federal grant regulation 40 CFR 30.307 requires all recipients to provide a minimum of 5% of the total project cost, which may not be taken from federal sources.

Review Process

All applications are initially reviewed by the Agency to determine their legal and administrative acceptability.

Acceptable applications are then reviewed by the appropriate peer review panel. This review is designed to evaluate and rank each proposal according to its scientific merit as a basis for recommending Agency approval or disapproval. Each peer review panel is composed primarily of non-EPA scientists and engineers who are experts in their respective disciplines.

The panels use the following criteria in their review:

- Quality of research plan (including theoretical and/or experimental design, originality, and creativity)
- Qualifications of principal investigator and staff including knowledge of subject area
- Potential contribution to scientific knowledge
- Availability and adequacy of facilities and equipment
- Budgetary justification

Proposals which receive a panel's approval based upon scientific merit are further evaluated by EPA officials for relevance to the Agency's mission and budget appropriations. A summary of the scientific review and recommendation of the panel is provided to each applicant.

The review process described above is applicable to all applications received, whether in the general or targeted (RFA) procedure.

Research Areas—General Grants Program

The four research areas under which the general grants program is conducted are described below. The description of each area includes a list of general research topics within that research area which are considered to be especially relevant to the Agency's mission. In addition, a schedule of significant dates for receipt and review of research proposals is included in each research area for the anticipated FY 1988 program.

Environmental Health

The major objective of the Environmental Health Research Program is to obtain and provide a scientific basis upon which the Agency can make regulatory decisions concerning human health risk assessment after exposure to environmental pollutants. The principle concern is to determine whether, and to what extent, exposure to various pollutants contribute to environmentally related health risks.

Areas of interest include but are not limited to:

- Improved Models and Methodologies for Human Risk Assessment
  - — Development of methods to assess the risk of environmental contaminants for a variety of health endpoints other than cancer (including reproductive, developmental, behavioral immunological, neurological and cardiovascular

disorders, renal disease, chronic bronchitis and emphysema)

- Development of short-term assays which mimic the metabolism and/or the molecular, cellular or biochemical process being affected by specific toxicants

- Development of more extensive *in vivo* and *in vitro* assays for all classes of potentially toxic chemicals considered relevant to humans at risk

- Studies of pharmacokinetics to determine the body burden and effects of ingested and otherwise contacted chemical and physical toxic agents

- Studies to determine the adverse effects of environmental toxicants on the immune function, and ways to enhance immune response

- Studies to determine the effect of predisposing factors (e.g., genetic, hormonal, nutritional factors, biological rhythm, previous exposure, disease state, etc.) on reaction to toxic agents

- Development of methods to program the results obtained with validated testing strategies into an artificial intelligence to predict toxicity based on structural activity relationships

● Risk Assessment and Predictions

- Studies directed toward improved extrapolations from high-to-low doses and from animal models to humans; long-term animal studies of chronic exposure to provide basis for high-to-low dose extrapolations

- Development of more sensitive techniques for measuring chemical and physical toxic agents and their metabolites in biological media

- Development of risk extrapolation methods incorporating information and mechanisms of action, pharmacokinetics, and information from interspecies responses to related endpoints

- Studies to identify the potential routes of exposure in biological systems to chemical and physical toxic agents, and the possible different toxicities manifested following exposure by these diverse routes

- Studies of multiple exposure models to determine possible synergistic, additive, and antagonistic

effects of toxic agents

— Studies that define the rates and mechanisms of chemical reactions at the cellular level of important toxic agents in the environment

— *In vivo* and *in vitro* studies for developing and validating rapid, reproducible, and sensitive screening tests that can be used to assess potential toxicity

● Risk Assessment in Human Populations

— Identification of target populations and effects on these target populations at risk from exposure to toxic agents. The nature and range of susceptibility should be included

— Development of biological markers in populations to improve early detection of exposure and future chronic diseases, and to estimate their sensitivity vs. specificity

— Development of methods to better correlate relationships between exposures and health effects resulting from chronic long-term exposure or where the interval between exposure and effect is extended. Consideration should be given to subtle effects such as genetic or behavioral toxicity as well as morbidity or mortality

The following schedule applies to the Environmental Health Grants Program in FY 1988.

Application Closing Date	*Panel Review Meeting*	*Relevancy Review*	*Earliest Date for Notification of Award*
February 16	*May*	*June*	*July*

For further information, please contact:

George R. Simon
Science Review Administrator (RD-675)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(202) 382-7445

Environmental Biology

The Environmental Biology Research Program supports a broad range of research in the areas of risk assessment, ecosystem structure and function, toxicology, biotechnology and degradation processes. The program seeks information that, in combination

with exposure data, allows the prediction of the environmental risk of pollutants on individual organisms, populations, communities and ecosystems.

Areas of interest include but are not limited to:

- Risk Assessment
  - Methods to assess and predict environmental risks of single-chemical or complex mixture on ecosystems and their components
  - Development of comparative risk assessment procedures to estimate the risk associated with hazardous waste sites
  - Techniques that will permit testing and validation of laboratory findings and model verification under field conditions, especially in the areas of biological availability and effects of contaminants
  - Determining the pathways, interactions, and impacts of genetically engineered microorganisms which enter environmental systems. Of particular interest are applications for environmental monitoring and ecological risk assessment
  - Screening methods for predicting exposure, fate and eco-toxicity of chemicals, including chemical mixtures at low concentrations. The development of systems and models (including the structure-activity concept) through which persistence, bioaccumulation, eco-toxicity, and biodegradation may be predicted
- Ecosystem Structure and Function
  - The cycling, including sorption/desorption of pollutants and biodegradation products with long time constants in biological systems and ecological processes
  - The relationship of ecological genetics and natural selection processes as they are influenced by the impact of pollutants upon ecosystem properties
  - The differential importance of components of ecosystems to the whole. Studies are solicited which assess the vulnerability of ecosystem components to natural and anthropogenic damage and the relative ecosystem resiliency and recovery
  - Modeling studies to develop new qualitative and quantitative methodologies in order to predict pollutant effects

— Studies of pollution impacts on biotic resources in cold-climate ecosystems including the tundra and estuarine areas

- Toxicological Effects

  — Studies delineating the effects of gaseous and particulate air pollution (e.g., acid rain) on forests, crops, and receiving waters and their biota

  — Studies to examine the biochemical, physiological and ecological mechanisms by which major pollutants combine to alter plant growth and produce pathological symptoms in plants

  — Studies on the sublethal effects of toxic chemicals and their biodegraded products on the behavior growth, reproduction and cellular/molecular processes in animals

  — Modes by which aquatic and terrestrial organisms are exposed to chemicals in waters, sediments, soils and air

  — Studies defining the role of microorganisms in the movement, transfer and destruction of pollutants in soil and water

  — Effects of chemicals on wildlife, including effects on populations and individuals

  — Ecological significance of the loss, due to exposure to toxic chemicals, of a portion of a natural population

The following schedule applies to the Environmental Biology Grants Program in FY 1988.

Application Closing Date	*Panel Review Meeting*	*Relevancy Review*	*Earliest Date for Notification of Award*
February 15	*May*	*July*	*August*

For further information, please contact:

Clyde C. Bishop, Jr.
Science Review Administrator (RD-675)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(202) 382-7445

Environmental Engineering

The Environmental Engineering Research Program supports fundamental research needed to provide solutions to pollution control problems outside the scope of the Agency's response-directed research program. New, innovative toxic substances control and waste management techniques are sought to provide cost-effective advanced multi-media (solid, liquid, gaseous) pollution control technology.

Areas of interest include but are not limited to:

- Proof-of-concept research in high-risk, high-potential technical areas
  - — Biodegradation of toxic substances; the treatment of complex mixtures of pollutants to reduce toxicity
  - — In-plant unit process operations minimizing or eliminating toxics generation and release to the environment
  - — Biotechnology advances for the degradation of toxic and/or hazardous wastes in contaminated water, ground water, and sediments and for improving biological process treatment and mitigation of environmental pollution problems
  - — Development of improved techniques to prevent ground-water degradation and to clean up ground-water contamination
  - — Prevention technology to minimize adverse human health and ecological effects resulting from accidental releases of toxic materials
- Pilot-scale evaluation and cost performance testing of innovative technologies
  - — Improved thermal destruction (incineration) or other treatment techniques, e.g., biological or chemical, for the final disposition of hazardous materials
  - — Handling and disposal of hazardous solid wastes, including detoxification, solidification, and otherwise fixing organic waste before disposal in secure landfills
  - — Innovative approaches for reduction of indoor air pollution
  - — Improved techniques for low cost capture of particles less than 10 micrometers including condensation aerosols, in retrofit applications, prior to exiting stack

- Innovative techniques to control or remove toxic air emissions and VOCs from industrial or combustion sources, including vent and flue gases

- Simultaneous control of particulate matter, NOx and SOx in combustion and/or post combustion processes

- Municipal water and wastewater sludge volume reduction and final disposal practices which lower concentrations of pathogens, heavy metals, and synthetic organics; recovery techniques for metals from industrial sludges

- Clean-up techniques (e.g., in-situ treatment) for contaminated soils, structures, surface and groundwater, and asbestos

- Fundamental thermal destruction/combustion research leading to less pollutant production and to better incineration of hazardous waste

  - Investigation of flame reactions, propagation, and quenching mechanisms

  - Investigation of selective and non-selective catalysts for control of NOx and organic particulate matter in high temperature combustion processes

  - Investigation of operating conditions enabling development of predictive models for products of incomplete combustion in hazardous waste incineration

The following schedule applies to the Environmental Engineering Grants Program in FY 1988.

Application Closing Dates	*Panel Review Meeting*	*Relevancy Review*	*Earliest Date for Notification of Award*
February 15	*June*	*July*	*August*
August 15	*October*	*November*	*January*

For further information, please contact:

Donald F. Carey
Science Review Administrator (RD-675)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(202) 382-7445

Environmental Air/Water Chemistry and Physics

The Environmental Air/Water Chemistry and Physics Program supports research leading to the basic scientific tools for establishing the levels at which pollutants occur or might occur in the environment. The program includes projects in analytical chemistry, studies on chemical reactions and their rates and on the physics of the movement of pollutants in air, water, and soil. The resulting tools and information will allow the estimation of total exposures needed for risk assessments.

This program is divided into:

I. RESEARCH ON AIR POLLUTION

II. RESEARCH ON POLLUTION OF FRESHWATER, MARINE, ESTUARINE WATERS, GROUNDWATERS, SOILS AND SEDIMENTS

Areas of interest include but are not limited to:

I. AIR POLLUTION

- **Exposure Monitoring Systems and Advanced Analytical Methods**
  - — Development of exposure monitoring systems, instruments or devices for continuous and discrete sampling of inhalable pollutants
  - — Development of advanced analytical methods for the direct analysis of organic compounds in the gaseous and solid phases and for the rapid screening of samples for the presence of classes of organic compounds
- **Transport and Fate Studies**
  - — Studies of the physical structure and chemical composition of fine particulates. Studies on how these particulates are formed, transported, and removed from the atmosphere
  - — Studies of the chemical and physical transformations of specific toxic and hazardous compounds (and their intermediates) in ambient air
  - — Assessment and quantification of the role of solid aerosols in atmospheric reactions
  - — Studies to assess whether anthropogenic emissions into the atmosphere have a significant effect on local or global climate

- Modeling Studies

  — Continued development and refinement of receptor model and source apportionment techniques

  — Development of reliable models for predicting ground-based pollutant concentrations in complex terrain from single and multiple sources

  — Development of models capable of quantifying pollutant concentrations or deposition rates over urban, mesoscale and large areas

The following schedule applies to the Environmental Air Chemistry and Physics Grants Program in FY 1988.

Application Closing Dates	*Panel Review Meeting*	*Relevancy Review*	*Earliest Date for Notification of Award*
March 15	*May*	*June*	*July*
August 15	*October*	*November*	*December*

For further information, please contact:

Louis G. Swaby
Science Review Administrator (RD-675)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(202) 382-7445

II. RESEARCH ON POLLUTION OF FRESHWATER, MARINE/ESTUARINE WATERS, SOILS, GROUND-WATERS, AND SEDIMENTS.

- Transport and Fate Studies

  — Studies of transport and transformation processes in the surface and subsurface environment in order to predict the impact of surface conditions on ground-water systems.

  — Studies of the transport and fate of toxic chemicals in lakes, rivers, and estuarine waters with emphasis on providing information required for use in predictive exposure models

  — Development of predictive water quality models and techniques of varying complexity for application to toxic substances, nutrients,

anoxic conditions, and resuspension of dredged material after aquatic disposal

- Monitoring Systems and Analytical Methods

  — Research in chemistry and physics to develop advanced analytical and monitoring techniques for increasing sample through-put, sensitivity and selectivity, and for field use

  — Develop new methods for screening a variety of samples for toxic substances and classes of organics and for monitoring waste streams

  — Develop geophysical monitoring techniques applicable to the measurement of flow and migration rates of groundwater and leachate

The following schedule applies to the Environmental Water Chemistry and Physics Grants Program in FY 1988.

Application Closing Dates	*Panel Review Meeting*	*Relevancy Review*	*Earliest Date for Notification of Award*
March 15	*May*	*June*	*July*
August 15	*October*	*November*	*December*

For further information, please contact:

Louis G. Swaby
Science Review Administrator (RD-675)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(202) 382-7445

Request for Applications

The number of RFA's that will be issued in 1988 is subject to the availability of funds in OER's FY 1988 Research Grants Program. While a specific research topic has not yet been chosen, it is anticipated that one RFA will be issued during the month of March 1988, covering some aspect of pollution abatement and control from Superfund sites. The Request for Applications will appear in the Federal Register, Commerce Business Daily, and various technical journals relative to the subject matter of the RFA.

Minority Research Grant and Student Fellowship Programs

Minority Institutions Assistance (MIA)

The U.S. Environmental Protection Agency has initiated a special assistance program entitled, Minority Institutions Assistance (MIA) program. The objective of the program is to award grant funds for the support of exploratory research by faculty and to support undergraduate and graduate fellowships for students enrolled at eligible institutions. The principal purpose of this program is to provide Federal assistance to Historically Black Colleges and Universities (HBCU's) as directed by Executive Order 12320, issued on September 15, 1981.

Terms and Restrictions for Research Assistance

- Consideration will be given only to applications submitted by institutions subject to Executive Order No. 12320, and identified by the Secretary of the Department of Education as Historically Black Colleges and Universities.
- In contrast to the regular grants program, preapplication assistance is available upon request. A potential investigator may submit a preproposal for informal scientific review and determination of its relevance to Agency research goals.
- The Application Form (5700-12), instructions and procedures are the same as those used for EPA's regular research grants, except that "MIA" should be typed in item (3) on the face page to identify the program to which the application is directed.
- All of the topic areas described previously for the regular research grants program are applicable to the MIA program.

Terms and Restrictions for Student Fellowship Assistance

- Consideration will be given only to applicants who are enrolled full-time and in good standing with an eligible institution (HBCU).
- The applicant must be a senior or graduate student with a cumulative Grade Point Average (GPA) of 3.0 or higher on a scale of 4.0.
- All applications will be reviewed and evaluated for the

following: (1) individual's orientation towards and commitment to a career in the Physical Sciences (Chemistry, Physics, Math, Engineering), Biological Sciences, Environmental Sciences, Computer Sciences, (2) Grade Point Average (GPA) verified by college transcript, (3) applicant's statement of objectives and personal goals (4) recommendations by the sponsor and faculty and (5) employment experience related to the field of study.

- These Student Fellowship applications must be properly executed on EPA Forms. Failure to complete all forms with appropriate signatures will delay processing or disqualify the application. Each application must enter "MIA" in the upper left hand corner of the face page, EPA Form 5770-4.

- Applicants must be citizens of the United States or its possessions, the U.S. Virgin Islands or Puerto Rico.

- The Environmental Protection Agency reserves the right to limit the number of awards to a particular college or university.

For further information, please contact:

Walter H. Preston
Ombudsman, MIA
U.S. Environmental Protection Agency (RD-675)
401 M Street, SW
Washington, DC 20460
(202) 382-7445

or

Clyde C. Bishop, Jr.
Science Review Administrator

Appendix A

Laboratories of The Office of Research and Development, USEPA

Health Effects Research Laboratory
Research Triangle Park, NC 27711
(919) 541-2281

Environmental Monitoring Systems Laboratory
P.O. Box 93478
Las Vegas, NV 89193-3478
(702) 798-2100

Water Engineering Research Laboratory
Cincinnati, OH 45268
(513) 569-7951

Environmental Research Laboratory
South Ferry Road
Narragansett, RI 02882
(401) 789-1071

Environmental Monitoring Systems Laboratory
Research Triangle Park, NC 27711
(919) 541-2106

Environmental Research Laboratory
Sabine Island
Gulf Breeze, FL 32561
(904) 932-5311

Hazardous Waste Engineering Research Laboratory
Cincinnati, OH 45268
(513) 569-7418

Environmental Monitoring and Support Laboratory
Cincinnati, OH 45268
(513) 569-7301

Environmental Research Laboratory
200 SW 35th Street
Corvallis, OR 97333
(503) 757-4601

Environmental Research Laboratory
College Station Road
Athens, GA 30613
(404) 546-3154

Environmental Research Laboratory
6201 Congdon Boulevard
Duluth, MN 55804
(218) 727-6692

Atmospheric Sciences Research Laboratory
Research Triangle Park, NC 27711
(919) 541-2191

Air and Energy Engineering Research Laboratory
Research Triangle Park, NC 27711
(919) 541-2821

Robert S. Kerr Environmental Research Laboratory
P.O. Box 1198
Ada, OK 74820
(405) 332-8800

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